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History Of The Florida Citrus Industry

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VOL 39 — NO. 9 SEPTEMBER, 1958 BARTOW, FLORIDA

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W. L. Thompson

Citrus Insect Control

R. M. Pratt

For September 1958

W. L. THOMPSON
R. M. PRATT
R. B. JOHNSON*
Florida Citrus Experiment Station, Lake Alfred

R. B. Johnson

Purple scale infestations reached a peak at the end of July at the highest level in the eight years of record. There was a sharp reduction in most groves in August. A slowly increasing trend will begin in September, but the general level of activity will be low.

Red scale infestations were still low in July, but the number of infested groves has been increasing. The population will still be low in September, but will increase rapidly in October, and infestations will be heavy in many groves in October and November.

Purple mite infestations will increase slowly in September, but will be low in most groves.

Rust mite infestations will start increasing in September, especially in groves that were sprayed or dusted with sulfur during the summer. The general level will remain low, but there will be an increase in October.

Texas citrus mites are likely to become numerous in some groves in September.

SPRAY PROGRAM

The summer scalicide application has been made, so it is now time to inspect the groves for scale infestations to determine whether any of them will need a second scalicide. Close attention should be made to groves sprayed in June and early July and especially groves that were heavily infested when sprayed regardless of when the application was made. Red scale infestations are most likely to be a problem in groves sprayed before mid-July. Red scale infestations are not uniform, that is, some trees or parts of trees may be heavily infested while other trees appear to have a light infestation. Even though the infestation is spotted, the whole grove should be sprayed because an apparent light infestation in September can develop into a heavy one by November or December.

Tangerines and early varieties of oranges and grapefruit should be inspected for purple and chaff scale on the fruit. Both species of scale cause an injury to the peel, called green spots, that does not degreen in the coloring room.

Scale Control: Either parathion or malathion is recommended because neither of these materials affect soluble solids in the juice or affect degreening of fruit. Use 1 to 1.7 pounds of 15 percent parathion, or 3 to 5 pounds of 25 percent malathion, or their equivalent in other forms, per 100 gallons. The lower dosage of either parathion or malathion is for light infestations, but if there is any doubt, use the higher dosage. A very thorough coverage is essential for good control because the fruit is large and difficult to cover with the spray.

An oil spray applied in September will definitely retard degreening and will very likely have a depressing effect on soluble solids in the juice. If an oil was applied in the summer and is followed by another application in September, a very serious depressing effect on solids is likely to result and a good job of degreening is almost impossible, even with an excessive number of hours in the coloring room. Tangerines should very definitely not be sprayed with oil during the fall months.

Rust Mite Control: Groves should be sprayed for rust mite when 10 to 20 percent of the fruit is infested where either sulfur or Chlorobenzilate was used in the last spray. The need to respray immediately when 10 to 20 percent of the fruit is infested with rust mite may not be so critical where zineb was used, because rust mite infestations usually do not recover from a zineb spray as rapidly as after applications of sulfur or Chlorobenzilate. It is not necessary to immediately respray groves previously treated with zineb where only an occasional rust mite or two are found on fruit. Such groves should be checked frequently and retreated when rust mite starts to increase. On the other hand, always respray immediately where rust mite is numerous on 10 to 20 percent of the fruit.

In some zineb-sprayed groves, rust mite may become numerous only on the new flush of foliage. It is not necessary to control these mites before fall, unless they are also numerous on the fruit.

Zineb at ½ pound per 100 gallons is the most effective material. Chlorobenzilate at ½ pound or ½ pint per 100 gallons is less effective than zineb, but slightly better than sulfur. Both zineb and Chlorobenzilate are contact sprays and thorough application is necessary for good control. Wettable sulfur at 10 pounds per 100 gallons or a sulfur dust may also be used. However, a wettable sulfur spray is preferred to sulfur dust for heavy infestations, and will

(Continued on page 11)

SCALE AND MITE ACTIVITY BY DISTRICTS*

District	Purple Scale	Red Scale	Purple Mite	Rust Mite on leaves	Rust Mite on fruit
West Coast	2.97	4.50	.67	1.66	2.00
Indian River	3.86	3.11	.12	1.01	1.60
Upper East Coast	3.92	0	1.67	2.34	1.40
Gainesville	2.67	.50	—.75	.25	0
Orlando	3.63	.40	.37	.50	1.33
Brooksville	3.88	3.26	.50	.50	.34
Ridge	4.94	3.33	.69	1.36	1.81
Bartow	5.09	1.15	.14	.42	1.00
State Average	3.94	3.20	.48	1.09	1.32
Last Year	3.37	3.00	.47	1.27	1.50

* Third week in August. Activity is computed from populations, amount of hatching of scales, and number of groves with increasing or decreasing infestations. Activity is considered high if above 4.0 for purple scale, 3.0 for red scale, and 1.5 for mites.

* Written August 21, 1958. Reports of surveys by Harold Holtsberg, Fort Pierce; J. W. Davis, Tavares; K. G. Townsend, Tampa; T. B. Hallam, Avon Park; and L. M. Sutton, Lake Alfred.

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History Of The Florida Citrus Industry

. . . Given By . . .

RANDALL CHASE

AT CAMP McQUARRIE, AUGUST 13, 1958

The Florida citrus industry is the largest agricultural industry in the state, the most glamorous, and was probably the first industry on the North American continent.

The word "citrus" probably originates from the word "Citron," which was the name of a town in Judea (1). There are several references in the Bible to fruits, but we find no specific mention of citrus altho there is an abundance of information indicating that it was cultivated in Biblical times. We find a reference to Joshau having had a grove and encountering much sorrow and trouble. We feel sure that must have been a citrus grove.

The orange has always been the most sought after of fruits. Kings bartered for it. Desert caravans carried it, and man in his early conquest for food recognized its value and treasured it highly. Columbus included the orange in his somewhat limited food supply when he sailed in search of the new world. The late J. H. Whitner, who was a Professor of Agriculture at the State College of Agriculture in Lake City, called it "the great staple fruit of Florida." Marjorie Kinnan Rawlings referred to the orange as the "Golden Apple."

It is thought the orange originated in Southeast Asia. It has been cultivated in the Malay archipelago from time immemorial. About 200 B. C. it was brought into China, and the patience of the oriental man contributed to the development and improvement of the fruit. They practiced cross pollination, grafting, and apparently tried different root stocks. The knowledge so gained was passed on from generation to generation, however, a good deal of it was lost when the orange was taken to other lands. The Arabs seem to have carried the orange into Persia and Palestine, thence to Northern Africa and Spain. The Crusaders are thought to have taken the orange to Italy early in the sixteenth century (1).

Citrus Introduced In Florida

Citrus fruits particularly oranges, were introduced into Florida some time between 1513, when Ponce de Leon arrived, and 1565, when St. Augustine was founded. Commercial production in Florida probably dates from the planting by Jesse Fish of his grove on Anastasia Island, near St. Augustine, about 1763 (2). Fish, a native of Long Island, was an agent of the New York trading firm of Walton & Company. His development of the orange was the result of an unhappy domestic situation. Fish was so distressed over the conduct of his young wife that he took up residence on Anastasia Island, out of sight of "frivolous and unfaithful behavior." (2) (7).

The first record of shipments was in 1776 when 65,000 oranges and 2 casks of juice was shipped out of Florida to England (6). The grove was reported to be about 30 to 40 acres, and consisting of about 1500 trees (2). The Dummett Grove on Merritts Island was started about 1830 by Captain Douglas Dummett, a native of Barbados. He first came to New Smyrna to devolp a sugar plantation, where he undoubtedly observed some orange trees in the Jones Grove, which were said to have been planted by some of the Turnbull Colonists in the late 1760's. This grove contained trees producing exceptionally fine quality fruit, seeds for which were supposed to have come from Spain. When Captain Dummett acquired the site on Merritts Island there was a number of sour orange trees growing there. These he topworked from budwood cut from the Jones Grove, then planted orange seedlings, spaced about 20x20, which he later budded with budwood from the Jones Grove (1).

Doctor T. Ralph Robinson, of Terra Ceia, who is an authority on citrus, is of the opinion that these topworked trees or buds which were several feet above the ground are responsible for the survival of the Dummett Grove thru the disasterous freeze of 1835. It was by the use of budwood and seeds from the Dum-

mett Grove that much of the early Indian River citrus industry was re-established after the cold.

There is a legendary curse that mysteriously surrounds the Dummett Grove. It was the finest grove in the state, alto its owner spent much of his time hunting and fishing and the production of oranges was mainly incidental. It seems that Captain Dummett did not live up to the standards of the grove. In his will he acknowledged several illegitimate children, who participated in his estate.

Indian River Fruit Origin

Blackwood's Edinburg Magazine praised the Indian River orange, and credited its existence to the noble trees of the Dummett Grove, saying "It is not to be mentioned in the same breath with ordinary oranges. It is a delicacy hitherto unknown." In 1881 an Italian and his rich American wife, then known as the Duke and Duchess of Castelluccio, bought the Dummett Grove for $30,000. it was at about the height of production, consisting of about 3,000 trees. The Duke, using his imagination and the Duchess' money, built a villa which still stands in the grove.

It is of categonal construction, to withstand gales and hurricanes. Even the gables are narrowed to lessen exposure to winds. Stout ship spars, salvaged from wrecks, rise from two sides of the reception lounge. About them run two staircases to the floors above. Rumor has it that the Duke spent his entire time hunting and fishing, while his American Duchess concerned herself only with entertainment. After a quarrel, by agreement, a partition was constructed dividing the villa into two equal parts, one for the Duchess and one for the Duke. In time they took leave of the Indian River, and the Dummett Grove passed on. According to the Italian Embassy the Duke was an imposter, and had no claim to a title (2).

Following the Dummett Grove, some of the early commercial plantings included the Speer Grove at Sanford, in 1842, a few trees of which are still standing; the Mays Grove on Drayton Island near the St. James River; the Dancy Grove at Orange Hill, in 1859; the Hart Grove at East Palatka; and a number of groves near Lake Weir, especially the Carney Grove and, farther north, the Sampson Grove at Orange Lake and some of the older groves at Citra, some of which are still thriving and in commercial production. The Sampson Grove, on the west side of Orange Lake, boasted of a very modern packing house for the early days. Here they had a machine to wrap oranges, which was of doubtful value.

It is important and interesting to note that the location of the early plantings was largely determined by the availability of transportation. In those days it was by water, and only occasionally were oranges transported over land by ox team. The Dummett Grove was on the Indian River, the Speer Grove on the St. Johns, the groves at Lake Weir and Orange Lake were tributary to the Oklawaha and St. Johns Rivers. The sites of the groves were usually high hammock soil, rich in vegetable matter, and mostly sour rootstock was used, which produced fruit of very excellent quality, good color, and high in solids and acid. The reputation of the Florida orange was established by this excellent quality fruit.

General Sanford

To General Henry Shelton Sanford should go credit for one of the greatest contributions to the Florida citrus industry. The General was a man of great vision, considerable means, and a tremendous desire to develop and create. He was a world traveller, and a recipient of several degrees both at home and abroad. In 1870 he made the trip up the St. Johns River to Mellonville, then the head of navigation. The country side here held a great attraction for the General and he purchased an old Spanish grant, of about 40,000 acres, from General Pinnigan.

He is reported to have paid $1.00 an acre for it. The General had visions of developing a town, which now bears his name, agricultural and horticultural research and exploration, and especially the development of citrus. A tract of land southwest of Sanford, totaling about 400 acres, was selected for the Experimental Gardens, and he named it "Belair." Citrus trees, budwood and seeds were imported on an extensive scale in the Belair Gardens.

Some of the citrus varieties were developed solely for their abundance of essential oils, used in perfume and for other special purposes. From "Belair" much budwood was distributed throughout Florida, and even to California. General Sanford was carrying on research and experimentation with his personal means such as the govenment does now with taxpayers money. There were no governmental agencies in those days to such research.

The Belair Experimental Gardens contained many rare plants in addition to citrus, for instance, the first Lychee trees on this continent were grown at Belair; Date Palms were imported from the Holy Land, Coconut trees from the West Indies, Clausena Wampe fruit trees from China, Carnauba Palms from Brazil, over 75 varieties of Begonias, many varieties of pecans, Mexican Pepper plants, rare plants form New Zealand, New Caledonia, and other parts of the world. The object of the Experimental Gardens was to try out as many plants, both ormental and of food value, to see which would do the best and to determine which might be most suitable for propagation in central Florida. Prizes were offered by some of the first fairs to growers having the largest number of varieties of citrus fruits.

Early Production Records

Early records of citrus production are not very accurate. In the season of 1884-85 approximately 800,000 boxes of oranges were produced in Florida. The first records in California show that they produced 840,000 boxes in 1886-87. In that year Florida produced 1,250,000 boxes. About this time the railroads came and the Belair Experimental Gardens attracted prominent men representing wealth from this country as well as from some foreign lands. It was an era of great development, and the Experimental Gardens were an important place to secure information, plants and budwood for new citrus plantings.

Disasterous Freeze

During the season of 1893-94 Florida produced over five million boxes, and California less than half that amount. The winter of the great freeze of 1894-95 Florida shipped nearly three million boxes, and produced over six million boxes. The year following the freeze only 147,000 boxes were produced in Florida. It was not until the winter of 1902-03 that Florida's shipments again reached one million boxes. By that time California was producing about nine million. The season of 1942-43 Florida's production was 58,700,000 and exceeded California's. The official estimate for Florida last year was 102 million boxes, whereas California's was 31 million, but, because of the freeze, Florida actually harvested only about 82,500,000.

The production figures clearly demonstrate two important facts:

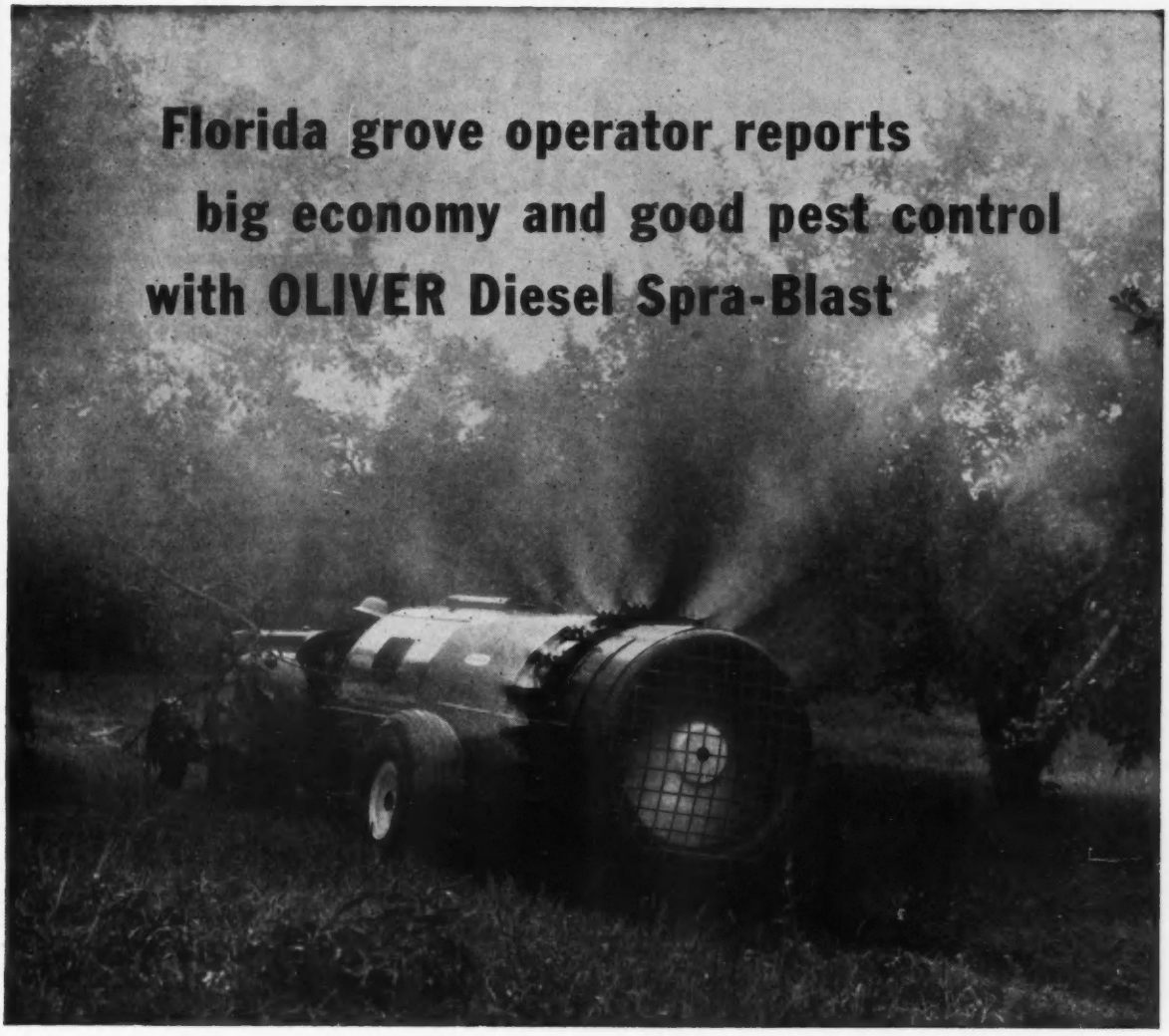
(1) How very dependent production is on weather conditions.

(2) The vital importance of consumer acceptance and satisfaction.

The reputation of Florida oranges was developed with fruit of unusually rich, high quality, carefully handled and packed, but shipped under not too favorable transportation con-

(Continued on page 8)

Florida grove operator reports big economy and good pest control with OLIVER Diesel Spra-Blast



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Says: Henry D. Gilliard
Wauchula, Florida

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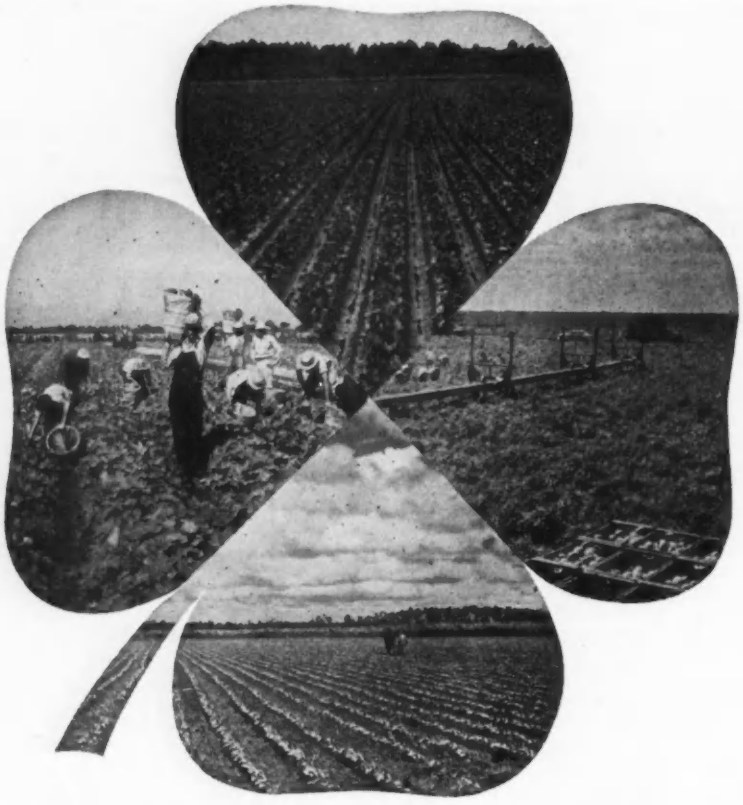

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HISTORY OF THE FLORIDA CITRUS INDUSTRY

(Continued from page 6)

ditions. This high quality fruit was in its natural containers, no washing, no coloring rooms, no dying, no waxing nor other laundry work. In the early days the fruit was carefully picked, handed down one at a time, sized without machinery, sometimes wiped by hand with cloths, packed in barrels, often with Spanish moss which wormed a cushion and permitted ventilation. This fruit had all its natural oil in the rind to protect its flavor and aroma.

Some years later each fruit was wrapped in tissue paper to protect it. Much of the sizing was done by hand, or by gravity, allowing the fruit to roll down two boards placed close together at the top and farther apart at the bottom of the slope. Then the machinery age came, and washing, polishing and waxing. Coupled with this was the machine age in the grove, and the use of tractors, dusters and sprayers, which stirred up a tremendous amount of dust which settled on the fruit making washing desirable so far as appearance was concerned, but which added nothing to the flavor or food value of the fruit.

In the early 1920's came the coloring, or de-greening, room, in which the fruit was heated and sweated under various gasses, making the rind very tender. The washing, dying, waxing and polishing removed much of the essential oil, and with it the high flavor and aroma which had made the Florida orange famous. As production increased the mechanization developed, both in the field and in the packing house, labor crews grew more careless and thought only of volume.

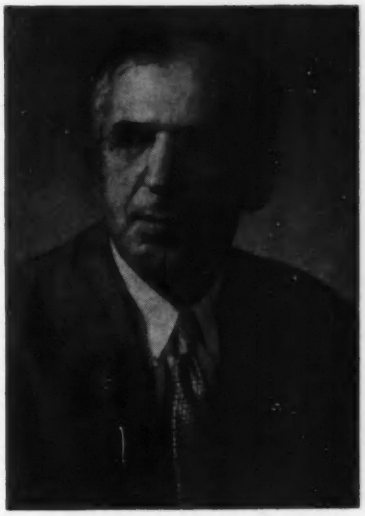
This was especially true during World Wars I and II. During this time California captured much of the high priced consumer business, which first belonged to Florida because of its high quality. The California orange was tougher, thicker skinned, not so much juice but with a natural high color, due to soil and climatic conditions. The great point of superiority and advantage of Florida in flavor was overlooked and ruined by field and packing house practices, except by growers in the Indian River section who were smart, guarded quality and promoted superiority for consumer acceptance.

Frozen Concentrate

With the advent of the frozen con-

(Continued on page 11)

The Outlook . . . For Citrus



. . . by . . .
H. G. HAMILTON
HEAD DEPARTMENT OF AGRICULTURAL ECONOMICS, AGRICULTURAL EXPERIMENT STATION. UNIV. OF FLORIDA

DELIVERED AT CITRUS INSTITUTE AUGUST 12, 1958

Lieutenant General James G. Harbord in making a talk opened with these words:

"The roads you travel so briskly
lead out of dim antiquity,
and you study the past chiefly because
of its bearing on the living present
and its promise for the future."

The hydrogen bomb has not stopped the study of past battles by military people. If we are to be realistic, what we know of the future is largely in the light of the knowledge that we have of the past. This is why so much emphasis is placed on experience. But we should never expect next year to be a perfect mirror of any past year.

Investigators of economic phonomenon employ essentially the same method as the physical scientist. The physical scientist works in a laboratory or on plots of land and works with things that obey his command. He is able to control the things he wants to test. In general, the economist cannot control the things he wants to test. But he takes empirical data and obtains results fro certain conditions that have existed.

Essentially both the physical scientist and the economist relate cause to effect; for example, nitrogen to yield, minor elements to quality. The physical scientist estimates the future relation of nitrogen to yields or minor elements to quality on the basis of what the relations have shown under test. The economist does exactly the same thing; he estimates the effect of volume on price for the future on the basis of how volume and price were related in the past.

I have no crystal ball to gaze into that will tell me exactly what the crop of oranges will be this coming season or five years from now, or what the price of oranges will be this season or five seasons from now. There is always the chance of some new factor entering the field that has not existed in the past. Last year this time we did not know about the December freeze of 1957. On the other hand, there are many things that do not change or change so gradually that the effect of the change is not important.

Many Facets

There are many facets to the price problem. In the first place, what price are we talking about? Is it the price of all oranges, early oranges, Valencia oranges, processed, fresh, or single strength juice oranges? Is it the on-tree price, packing house or retail price? Fortunately for our analysis, factors affecting one of these prices affects all of them but to different degrees. There are people in the industry whose business it is to analyze the degree which the price-making forces generate for each of the above prices. Time does not permit us to cover the ramifications that enter into all kinds of the above prices.

If we understood the factors that have influenced the price of fresh oranges over the past six years, from this knowledge we may get a glimpse of what the price will be this season.

From the 1952-53 season to the 1957-58 season three factors (or other factors paralleling these) accounted for most of the year to year variation in the Florida price of oranges used in fresh forms. These factors were (1) Florida and Texas per capita supply (2) California and Arizona per capita supply and (3) Disposable incomes.

Influence of Population

Where population is increasing as fast as it is in this country, it is necessary to convert total supply to per capita supply. Most people do not realize how short the orange crop was in the 1957-58 season. The U. S. production for the past season is estimated at 110 million boxes. It is necessary to go back only to the 1949-50 season to find a crop smaller than that of the 1957-58 crop. But it is necessary to go back 15 years to find a per capita supply of oranges smaller than this past season. To find a crop in which the per capita supply was nine per cent smaller than the 1957-58 crop you have to go back to the 1939-40 season. The 1957-58 crop in the aggregate was 51 per cent larger than the 1939-40 crop but on a per capita supply basis it was only nine per cent larger. It is difficult to realize that we now have 17 million more people than we had six years ago and 37 million more people than we had 15 years ago. Any outlook that does not consider the population growth factor is inadequate even for next year, to say nothing of 5 or 10 years in the future.

Per Capita Variances

The Florida and Texas orange crop over the past six years has varied from 474 to 555 boxes per 1,000 people and has averaged 523 boxes. During these six seasons a change in the per capita supply of oranges of 50 boxes per 1,000 people (which is 9 per cent) was associated with an inverse price change of 22 cents per box. Or, a change in the per capita supply of 10 per cent was associated with an inverse change in price of 24 cents per box.

In the case of California and Arizona oranges, the supply varied from 141 boxes to 292 boxes per 1,000 people and averaged 222 boxes. A change in the supply by 50 boxes per 1,000 people (which is 22 per cent) was associated with an increased price of Florida oranges of 16 cents per box. When the supply of California and Arizona oranges was increased by 10 per cent the Florida price decreased about 8 cents per box. It should be noted that a per capita supply change of 50 boxes per 1,000 people of Florida and Texas creased by 10 per cent the Florida oranges 22 cents per box and a change in the supply of California and Arizona oranges of 50 boxes affected the

(Continued on page 14)

Trends In The Processing Industry

MARVIN H. WALKER
GENERAL MANAGER, FLORIDA CITRUS CANNERS COOPERATIVE

Delivered At Camp McQuarrie August 12

We have seen many changes in the processing of Florida citrus fruit in recent years, and we will see many more in the years ahead. They will benefit growers in the future, as in the past, by expanding distribution and increasing consumer consumption of their crops.

Processed products unknown 10 years ago now are taking two-thirds of all Florida orange crops — which, in volume, is as many as the State produced 10 years ago. Since the first frozen orange concentrate was packed, we have seen the spectacular development of chilled orange juice, which is utilizing about 10 per cent of all Florida orange crops, and, more recently, the development of chilled citrus salad.

During the past season substantial packs of frozen orange concentrate and frozen grapefruit concentrate were used in blends with pineapple juice, both canned and frozen. Large bulk packs of frozen orange concentrate were sold to West Germany, where it is being reconstituted and sold as a bottled orange juice. And beverage manufacturers throughout the United States came to Florida for bulk packs of all concentrates.

Generally speaking, the trends in citrus processing favor products of better flavor and greater convenience which can be delivered to consumers at the least cost. It is just a matter of time, in my opinion, when Florida will pack a high-density frozen orange concentrate — to which 4 1/3 or 5 cans of water instead of 3 will be added — which will improve the keeping quality of this product and also reduce costs. This change won't come, however, until oranges are more plentiful and less costly.

These are changes occurring in processing methods which will affect costs, yields and quality. Most canners of grapefruit sections now are using fruit peeling machines, and in a few years we hope to have a machine which will sectionize grapefruit. In place of the hard-squeeze in juice finishers, concentrators have found they can recover more juice solids by pulp washing techniques — which may become a controversial issue for the Citrus Commission to resolve since excessive pulp washing can adversely affect quality.

While concentrators did what they previously thought was impossible in handling freeze-damaged fruit last winter, growers should not assume they can do it again. Concentrators were able to process freeze-damaged midseason oranges only because they did not ferment. If we had had a week of hot weather after the freeze last December, it would have been a different story — and the only outlet for many millions of boxes of damaged midseason oranges would have been as canned orange juice, which, under the circumstances, would not have been profitable for growers.

There are important trends in the marketing of frozen orange concentrate which will affect both packers and growers. During the past season five advertised brands took 37.8 per cent of the Florida pack in retail-size cans. The remaining 62.2 per cent was packed under packers' or buyers' brands, the latter including chain store brands which probably take 30 per cent of the State pack. Packs under chain store brands are increasing, and as they increase chain store buyers will have a much greater influence on frozen orange concentrate prices.

We are witnessing amazing changes in ways in which concentrators are getting their fruit supplies. When I came to Florida cooperatives were concentrators and cash buyers were cash buyers and "never the twain shall meet." But now most cooperative processors are buying some of their fruit and concentrators who previously bought fruit are forming cooperatives to supply it to them. Last season 43 per cent of the oranges used for frozen concentrate were purchased and the remaining 57 per cent were handled cooperatively. With fruit prices at high levels, packers naturally want to handle more fruit cooperatively, and more growers want to sell their crops for cash.

The largest packer of canned citrus juices and grapefruit sections recently announced it would discontinue packing these products, and pack only frozen concentrates next season. The reason seems obvious, that it appears impossible for a juice canner to make money at the prices now prevailing for next season's orange crops. But if canned juice packs and fresh fruit sales are greatly curtailed next season by high fruit prices, and a much larger percentage of the orange crop is used for frozen concentrate, packers of frozen orange concentrate may not make any money either. There is a limit to how much of the orange crop can be put into concentrate, without endangering the market value of that product.

The natural, logical trends in the Florida citrus processing industry are obscured today by the concern and confusion of packers over fruit prices. Whether fruit prices are at the right level today, whether they will go higher or lower, I do not know. The only thing I am certain about is that if early and midseason orange prices prove to be too high, Valencia orange growers will get lower prices.

During the past season Valencia orange growers got more than their oranges were worth in late April and May only because concentrators needed them and could take a loss on them because of the profit they had on oranges bought earlier. The trend in orange crop prices will be just the opposite next season if packers find they are losing money on early and midseason oranges.

CITRUS INSECT CONTROL FOR SEPTEMBER, 1958

(Continued from page 3)

also result in better initial control than zineb and Chlorobenzilate where complete coverage of fruit cannot be obtained.

Where there are heavy populations of rust mite and thorough coverage is difficult or impossible, the mixture of ½ pound of zineb and 5 pounds of wettable sulfur per 100 gallons should give a good clean-up and longer control than sulfur alone.

Zineb, Chlorobenzilate, and sulfur can all be used with parathion or malathion.

Purple Mite and Texas Citrus Mite Control: Since purple mite and Texas citrus mite infestations may be fairly low in September, control is not recommended unless a heavy infestation develops during a period of dry weather.

If control is necessary, there are several materials that can be used. The most effective is Tedion 25 percent wettable powder which is used at ½ pound per 100 gallons. Tedion is slow to bring mites under control, however, and should not be used on high populations unless supplemented with a quick killer like TEPP, parathion, or Chlorobenzilate. Tedion should not be used on trees bearing fruit unless the material used is expressly sold for that purpose. Other good miticides are Trithion at ½ pint per 100 gallons, Kelthane at 1½ pounds or pints, and Systox at 1 pint.

Details of spray schedules and the various materials used will be found in the "Better Fruit Program" and this should be consulted to determine which materials may or may not be combined. For further information, consult the Citrus Experiment Station at Lake Alfred or Fort Pierce.

HISTORY OF THE FLORIDA CITRUS INDUSTRY

(Continued from page 8)

trate industry a new concept of consumer satisfaction emerged. The concentrators most carefully gaurded quality, and made sound deliveries of juice, which captured much of the trade which formally used California oranges. One important lesson learned from this freeze is that of the necessity of developing and protecting consumer satisfaction. Prior to the freeze some concentrators, in a competative spirit of efficiency, squeezed the orange too hard in order to get the last drop of juice; the quality may have been impaired and consumer acceptance declined.

The freeze created new conditions never experienced by the concentrate industry. More scientific tests were used, more inspection, and the greatest of care in order to insure consumer satisfaction. Quality was guarded meticulously. The results are well known to all. Florida never put out a finer quality of frozen concentrate, prices improved and consumption held up. It is obvious that the great lesson of the freeze is to guard quality — the consumer will pay for quality products.

About the turn of the century a packing house that could put out two cars, of 300 boxes each, per day was considered a big house, and represented an investment of $2,500 to $3,000. Now a modern house with a moderage capacity costs about $100,000. Some of the larger houses cost several hundred thousand dollars.

No record of the citrus industry would be complete without mentioning some of the destructive freezes. Sub-freezing temperatures have caused more anxiety, monetary loss and setbacks in production than any other

(Continued on page 16)

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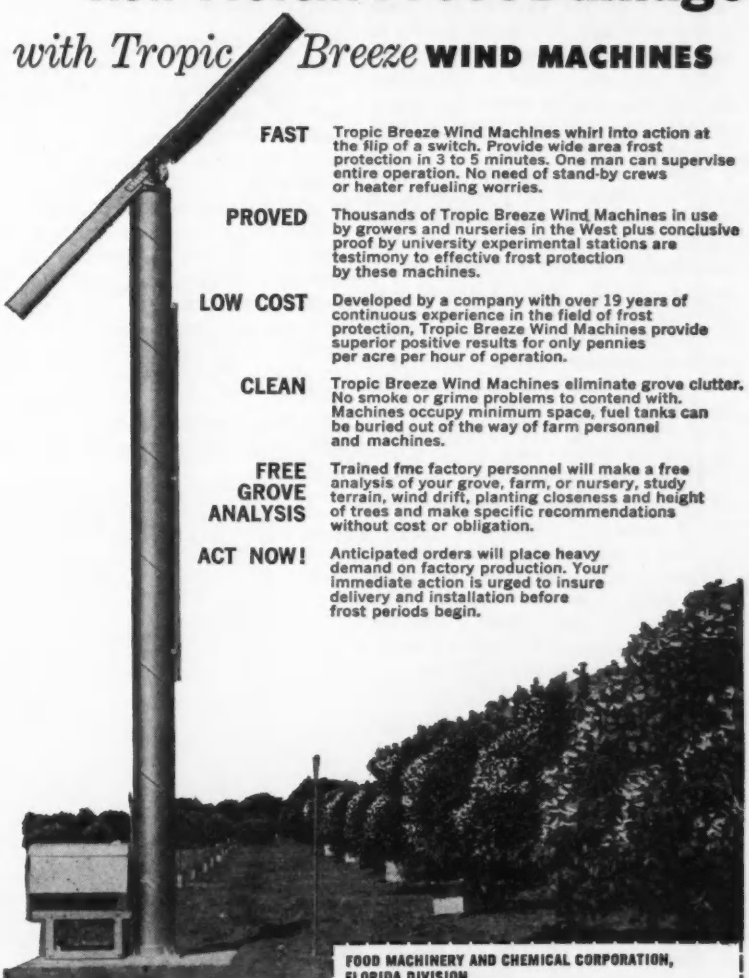

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. . . By . . .
O. C. BRYAN
TECHNICAL DIRECTOR
SOIL SCIENCE FOUNDATION
LAKELAND, FLA.

DELIVERED AT CAMP McQUARRIE CITRUS INSTITUTE

It is indeed a pleasure for me to participate in the silver anniversary of Camp McQuarrie. This organization has pioneered practical science discussions in Florida. No doubt many of you recall the lively discussion regarding soil and fertilizer problems in meetings over the citrus belt, especially Lake County, prior to the establishment of the camp. At that time, soil analysis data were unorthodox and considered heresy in some quarters. But marked progress has been made in production during the past 25 years, and much of this has stemmed from a wise use of soil analysis data.

Many private and public agencies are now engaged in some form of soil analysis for practical use. The chemical eye for ascertaining the availability of soil nutrients is an art as a science and has gained considerable popularity during recent years. But this is not an infallible science, because many soil and plant factors are involved. Most any experienced chemist is able to make a soil analysis, yet not be able to interpret his data. Proper interpretation after all is the crux, the absence of which leads to confusion and added costs.

Years of study were made endeavoring to correlate total soil nutrients with plant response, but the data could not be used satisfactorily. It became necessary to secure better methods of knowing whether or not a nutrient was present in too low, enough or too much in the soil. The methods now employed in making soil analysis consist of extracting the soil with dilute aids and or salts designed to duplicate the plant's ability to absorb nutrients. The method involves shaking a given amount of soil with the extracting reagent, filtering and determining the nutrients in the extract by chemical methods.

The results are usually expressed in pounds per acre, percent, or parts per million of nutrients which are considered as available. Some laboratories employ neutral salts for extracting agents and other dilute acids. These reagents extract different amounts of nutrients which require individual interpretations. The analyses are usually made from surface samples ranging from 3 to 12 inches in depth. Since this involves only a portion of the root zone as well as a portion of the soil nutrients, caution and interpretation are necessary regardless of the extracting reagents and methods employed.

Correlate Data

Because of the many soil and crop factors involved, it becomes necessay to correlate and calibrate the data secured for each soil and indicate whether or not the nutrients are present in deficient (low), adequate (medium) or excessive (high) amounts. To secure this information requires experimentation, caution and time. But correlating and calibrating plant responses with the levels of available nutrients is absolutely necessary before dependable interpretations can be made. The scarcity of calibrated citrus response to available soil nutrients is the bottleneck in the use of soil analysis in Florida. Furthermore, excessive amounts of some nutrients adversely affect others. This emphasizes the need for caution in making interpretation. The question of nutrient antagonism is a must in a wise interpretation of soil analysis data.

Dependable soil analysis for citrus was one of the major objectives in the establishment of the Short Research Grove in the late 30's. Here soil analysis and yield records have been correlated over a period of years for calibration purposes. Graphs 1 and 2 show the relation between available copper and magnesium on yield. Although the curves are imperfect they show some interesting relations, and serve as the basis for evaluating nutrient needs on Lakeland sand. The curves were made

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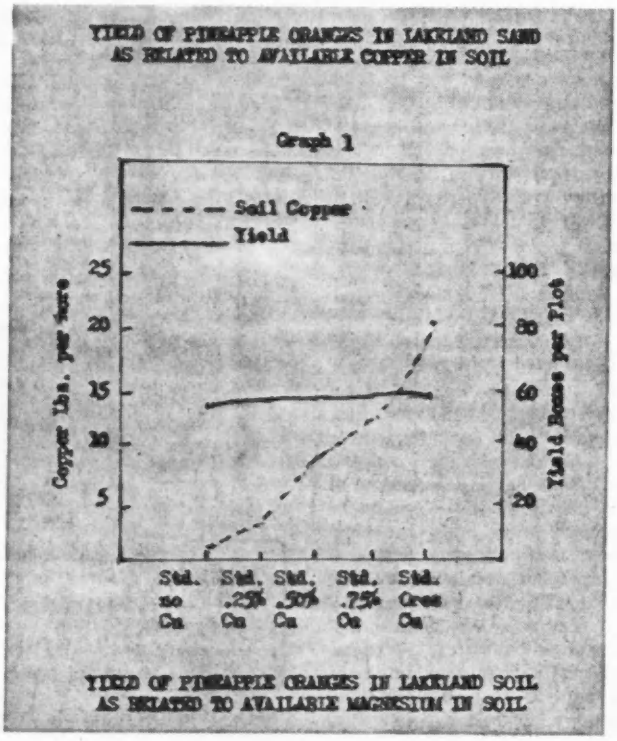

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THE OUTLOOK . . . FOR CITRUS

(Continued from page 9)

price of Florida oranges 16 cents per box. But because of the much larger supply of Florida and Texas oranges a 10 per cent change in the supply of Florida and Texas oranges affected the price of Florida oranges three times as a 10 per cent change in the supply of California and Arizona affected the price of Florida oranges.

Influence of Disposable Income

The third factor, that of disposable incomes (the amount of money people have to spend after taxes) varied from 250 to 300 billion dollars and averaged 277 billion. An increase of 10 billion dollars (which is 3 1/3 per cent) was associated with an increase in price of 13 cents per box. A 10 per cent increase in the disposable income was associated with an increase in price of 40 cents per box.

In the above results it has been indicated that these relationships held for all years. This is not quite the case. In four years the estimated price was approximately the same as the actual price. For one year, the 1956-57 season, the estimated price was 15 cents above the actual price. This is a rather significant amount. It means, of course, that the three factors considered did not explain all of the price this year. Some other factors that were not considered affected the price by this amount. It could have been quality of fruit, or an error in data, or any number of other things.

Can Make Own Forecast

Those of you who want to make your own forecast for this coming season can do a pretty good job if you can determine 3 factors: (1) the supply of Florida and Texas oranges per 1,000 people, (2) the supply of California and Arizona oranges per 1,000 people, and (3) the disposable income. Bear in mind the average price for the six seasons for Florida fresh oranges was $1.68 per box. The average supply of Florida and Texas oranges was 523 boxes per 1,000 people. The average supply of California and Arizona oranges was 222 boxes per 1,000 people.

The average disposable income was 277 billion dollars. If you assume or estimate that Florida and Texas oranges per 1,000 people will be 10 per cent less than the average supply of 523 boxes per 1,000 people, add 24 cents to the $1.68. If you **assume** or **estimate** the California and Arizona crop will be 10 per cent less than the average, you add another eight cents per box. If you assume that disposable income will be 10 per cent more than the average of the past six years, you add another 40 cents per box.

This would give $1.68 plus .24 plus .08 plus .40 equals $2.40. This is based on your assumption of what conditions are going to be. Furthermore, it is not for any particular variety or quality of oranges but it is the price for all Florida oranges for fresh use, not for one month but for the season. You need to assume further that there will be no other outstanding favorable or unfavorable factors appearing; that is, there will be no Cinderella or wicked witches during the season.

If the 1958-59 season is like any of the seasons from 1951-52 to 1956-57 or, for that matter, any season of record, prices within the season will vary from month to month and from week to week. Prices have varied greatly not only in seasons when crop estimates have changed but also in seasons when crop estimates have not changed.

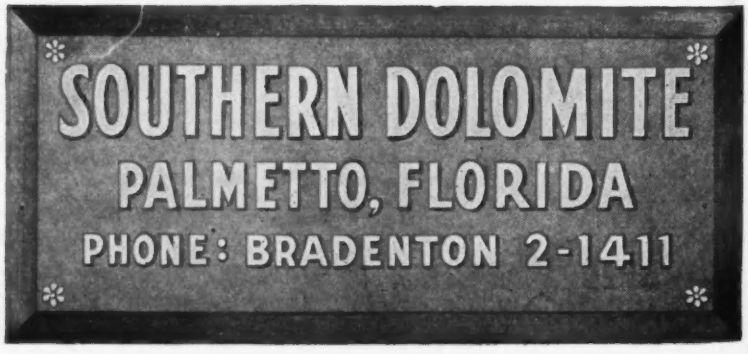
Seasonal Comparison

Examine the 1952-53 season. The crop estimate in October was 81 million boxes; in December the estimate was changed to 77 million boxes; and in February it was changed to 73,500,000 boxes. Prices for processed oranges in October were 56 cents per box for October, 84 cents for December and $1.38 for February. The November estimate for the 1953-54 season was 79 million boxes; in February the estimate was 86 million boxes. Prices in November of this season were $1.12 per box, in February 97 cents. There was no change in the estimate of the 1955-56 orange crop from October to February. The estimate for all months was 91 million boxes. However, the price changed from $1.22 in October to $1.97 in February. In addition to changes in the supply during a season many other changes may take place. A year ago about two million people were out of work, today more than five million are out of work.

For the six seasons, 1951-52 to 1956-57, the average difference in price for all fresh oranges and all processed oranges was 13 cents per box. But in the 1955-56 season the difference in price between fresh and processed oranges was one cent per box, and in 1956-57 it was 38 cents. The difference in the price of fresh and processed early and mid-season oranges averaged 13 cents and for Valencias the difference between fresh and processed prices was 14 cents per box. The average difference in the price of all early and mid-season oranges and Valencia oranges was 32 cents per box. But in the 1956-57 season the difference was only three cents per box in favor of Valencia oranges, and in the 1954-55 season the difference was 60 cents per box.

Because there is a relative free market for oranges, it is my opinion (and I cannot prove this) that the variation from the average price difference for fresh and processed oranges, which is about 13 cents per box, is due largely to quality; that the variation from the average difference in price between early and mid-season oranges and Valencia oranges of 32 cents per box is due largely to quality. Certainly the difference that buyers make between crops of the same variety of oranges even within the same week must be largely due to quality. It should be understood with higher prices these differences would be greater.

Any kind of a forecast is hazardous, and, particularly, is a long time forecast hazardous. Yet, when a person plants a grove he must make some kind of a forecast. Apparently, California orange production will decrease some further. Because the production now is only 25 million boxes, any downward change will not be significant from the standpoint of price. Furthermore, California is likely to have crops that will exceed the present low crop. Population growth, no doubt, will continue. However, for the next few years the rate of growth may be decreased. National economic growth is expected to keep pace with popu-



lation growth, but on a per capita basis economic growth will not likely increase at its present trend. Furthermore, any increased rate in real per capita growth may not affect the demand for oranges. In the long run, after we have recovered from the set back of last winter's freeze a sound basis of expansion would be in line with population growth. International conditions are too uncertain to consider in the long run.

Grapefruit Prices Vary

Grapefruit prices like orange prices vary greatly from season to season. However, over the past seven years the per capita supply of Florida and Texas grapefruit and disposable incomes (or the factors paralleling these) accounted for most of the year to year change in Florida grapefruit price. The boxes of Florida and Texas grapefruit per 1,000 people ranged, when adjusted for process — beginning and ending inventories, from 202 boxes in the 1957-58 season to 250 boxes in the 1953-54 season and averaged 231 boxes. During this period an increase of 20 boxes per 1,000 people was associated with a decrease in price of 17 cents per box. On a percentage change in supply, a 10 per cent increase in the supply of Florida and Texas grapefruit was associated with a 19 cents per box change in price.

A change of 20 billion dollars in disposable incomes was associated with a 12 cents per box change in price. Or, a 10 per cent change in disposable incomes is associated with a change in price of 15 cents per box.

No Forecast Perfect

As in the case of oranges the analysis is not perfect. In the 1953-54 season these two factors -- (1) Florida and Texas supply, and (2) disposable income — accounted for or were associated with most of the year to year variation in the price of Florida grapefruit. In the 1953-54 season the estimated price was only two cents below the actual price and in the 1955-56 season the estimated price was nine cents per box above the actual price. This, of course, means that some factor other than the Florida and Texas supply and disposable incomes affected the price.

Next season should the supply of Florida and Texas grapefruit be 10 per cent below the average supply per 1,000 people for the past seven seasons, the price should be 19 cents per box higher than the average price of 71 cents per box. Should disposable incomes be 10 per cent greater than the average for the past seven seasons, then add 15 cents per box to the average for the past seven seasons. Bear in mind this would be the estimated price for all Florida grapefruit for the season.

As in the case of oranges, month to month variation in grapefruit prices is greater than the year to year variation in price. Over the past seven years the average price of seedless grapefruit in May was only four cents per box higher than for Marsh. However, in May 1956 it was 44 cents higher and in May 1951 it was 39 cents lower. The price of grapefruit in November for the season 1950-51 averaged $1.05 per box. For the same season, the average price for the month of May was 78 cents per box or a difference of 27 cents per box. But in the season 1954-55, the difference was 50 cents per box.

For the seven seasons, 1950-51 to 1956-57, seedless grapefruit averaged a little more than twice the price of seeded grapefruit for all methods of sale. But for some seasons the price of seedless grapefruit was almost three times seeded grapefruit.

The demand for grapefruit has been falling for some time. An average price for grapefruit of 71 cents per box when supplies, population growth and incomes are considered, is quite low as compared to prices five years preceding the 1951-52 season. If there is any question in your mind about this, consider the following facts: U. S. production of grapefruit averaged nine million boxes more for the period 1945-46 to 1949-50 than for the period 1950-51 to 1956-57; population in the first period averaged 16 million less than in the latter period; disposable incomes averaged 80 billion dollars less in the former period than in the latter; however, prices in the 1945-46 to 1949-50 period average 27 cents per box more than in the 1950-51 - 1956-57 period. Reduced rate of planting grapefruit together with growth in population perhaps is sufficient to insure a profitable industry from now on if Texas does not become an important factor.

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HISTORY OF THE FLORIDA CITRUS INDUSTRY

(Continued from page 11)

one thing.

Record of Freezes

The great freeze of February 1835 was all but a knockout blow to the very small, infant, industry. No production records for that time have been located, but the acounts of the destruction indicate it was very great. Only a few favored spots escaped. One of those was the Dummett Grove on Merritts Island. There seemed little doubt but what some of the wild sour orange trees found in various parts of the state may have been producing commercial groves prior to the 1835 freeze, but were abandoned.

The next freeze of reorded importance to citrus seems to have been about 1876. This injured some trees, and destroyed much of the crop, but was far from being as destructive as in 1835. There was a similar freeze in 1886, and another in 1888, which destroyed much of the crop and resulted in some tree damage. The freezes during the winter of 1894-95 were by far the most destructive ever recorded in Florida, and perhaps to any citrus producing area. A large perentage of the trees were killed outright. Production decreased over 97 percent.

A number of cold winters followed, which were most disheartening to those sturdy pioneers trying to rebuild the citrus industry. There was no governmental aid, subsidy, loans or any other of the other alphabetical agencies. The Orange County Commissioners appropriated a sum to aid families in dire distress. It is to the everlasting credit of those pioneers that not a single dime was ever asked for. Today it is almost impossible for those who did not experience the 1894-95 freeze to comprehend the extent of the economic disaster.

The citrus industry, which was by far the most important agricultural industry in the state, was almost annihilated. The young railroad industry was particularly hard hit, and the promoters of the roads fully realized it. Without telephones, and with only limited telegraphic communications, and, of course, no radios, there was little warning that the Weather Bureau could give.

In February 1895 some of the railroads ran a special train, or engine, thru the citrus territory blowing its whistles and passing the freeze prediction by word of mouth. In other words it was sort of a Paul Revere riding on a locomotive. This might have been the Granddaddy of the Frost Warning Service. The weather following the freeze of December 1894 was warm, and moisture was good.

All of the citrus trees put out new growth, and were full of sap. The growers were optimistic about the excellent recovery the trees were making. Many fertilized and cultivated in order to hasten recovery. When the temperatures below 20 occurred, the morning of February 8, thousands of trees literally burst open, with reports like pistol shots, when they froze — just as a water pipe will burst when it is full of water and freezes. Many businesses were forced into bankruptcy, railroads went into receivership, and people left the state by the thousands.

Many Lost Everything

There were numerous instances of people living on groves who simply walked out, leaving groceries and household belongings behind, and even dirty dishes on the table. The remark has been made that everybody who had the price of a ticket left the state. This, of course, was somewhat of an exaggeration, but it does illustrate the great exodus. Before the freeze the town of Sanford, the center of citrus production, was a thriving community of nearly 5,000 people, with a substantial population in the back country. The 1900 census gives Sanford as having a little less than 2,000 population. When the great freeze came Rollins College was only about 10 years old, but it endured the hardships, and thru resourcefulness and great determination it survived.

Immediately following the freeze our fellow citizen T. W. Lawton, of Oviedo, was told by the college: "You may come for the whole college year, sleep all you wish; eat all you wish, and learn all you can for $100." The winter of 1899 was one of the coldest, when the temperatures at Tallahassee were offcially quoted as 2 below zero. Damage percentagewise, of course, was much less than in 1894-95. Production following the 1899 freeze only dropped off about one-third.

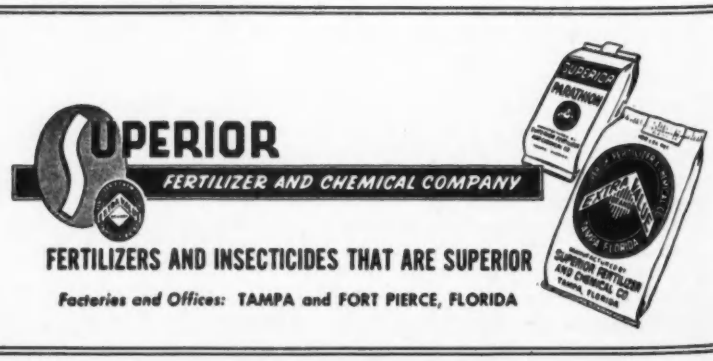
There were a number of winters following 1899 when sub-freezing temperatures were experienced, and some crop loss resulted, but serious tree damage was not great. In February 1917 very low temperatures were experienced following a warm wet period. Considerable tree damage resulted then, and production was reduced by about 30 percent. Another important freeze was in 1927, which resulted in a large crop loss. The freezes in the winter of 1934-35 dropped production about 10 per cent. The damage in the 1927 and 1934 freezes was severe in limited areas, but the industry came through fairly well.

During January and February of 1940 there was recorded in the citrus area some of the lowest temperatures and longest periods of sub-freezing weather. Production dropped from 56 million to 43 million boxes, or about 25 per cent. The weather was cloudy, with just enough rainfall. A larger percentage of the crop remaining on the trees was harvested than anticipated, and the tree damage was nothing like as great as the low temperatures would indicate. It was only a year or so before production was back to normal and increasing.

The freezes of 1957-58 have taken their place in history, but they are too recent and vivid in the minds of all of us to justify much space and time in this report. One thought, however, has occurred to many of us, and that is if we had had warm weather in January and February, similar to that in 1895, the destruction of trees would have been many times worse than it was.

Hurricanes

Hurricanes have been a hazard to the citrus industry from time to time, but generally in limited areas and mostly to crops — altho in a few cases they have caused substantial tree damage. The frequency of a damaging hurricane striking the mainland of Florida is one every



three years. There was a severe one in 1886. In 1910 another one came up thru the center of the state. The most recent one was in 1944. There have been numerous other storms which have struck either the Atlantic or the Gulf coast, and groves directly in the path lost most of their crop.

The Miami hurricane of 1926 completely wrecked the famous Flagler Grove, at Kendall, a few miles south of Miami, so that it never regained its former production. The Atlantic coast is more frequently visited by hurricanes in September; whereas on the Gulf coast more of them occur in October (5).

Insects and Diseases

From time to time the production of Florida citrus has been threatened by different diseases and insects, which at the moment seemed almost insurmountable. Up until the 20th century, with the exception of the area around St. Augustine, the industry seemed to have been comparatively free from serious threats of that nature. Shortly after the 1835 freeze there developed in the St. Augustine area what was then known as the Purple Blight. It was so severe that it discouraged growers from replanting and rebuilding their groves.

Mr. Robinson of Mandarin, on the St. Johns River, received a shipment of Mandarin trees direct from China. Some of these were sent to St. Augustine, and it is thought that the Purple Blight was transmitted on those trees. No doubt this Purple Blight was what is now known as Purple Scale. Eventually parasitical fungi and predaceous insects brought the Purple Blight, or Scale, under control (6). There was very little movement of equipment and materials from grove to grove, and, consequently, the spread of diseases and insects was slow; the biological or natural control seemed to have worked pretty well.

With the advent of automobiles and trucks, and the more extensive plantings, which in many areas were contiguous for miles, these troubles became more frequent. When the white fly first put in its appearance some growers felt they were ruined. Now you seldom hear it mentioned. Next they had citrus canker, which was most destructive, but thru the services of the federal and state authorities, particularly those of the late Doctor Wilmon Newell, Plant Commissioner in Gainesville, the trouble was eradicated. Trees affected with canker were pulled, burned, and the area sterilized. Various scales developed — Purple Scale, Florida Red, and others. As each pest or trouble showed up the Federal-State Experiment Stations assigned their research workers to the problem and developed controls.

The Mediterranean Fruit Fly eradication in 1929-30, under the federal government, reduced production from 35 million to 24 million boxes. The control program, plus shipping restrictions imposed by the federal authorities, precipitated much economic distress. There were a number of failures and bankruptcies. The cure almost ruined the patient. The last seige of Mediterranean Fruit Fly was handled in modern ways, principally from the air, and with a minimum of quarantine, so there was scarcely any disruption of the industry.

The pests mentioned are only a few of the many that from time to time might have been serious, but, sooner or later, have been brought under control. In recent years there has been a tendency to develop the biological or natural control of many pests, but for some effective biological control has not been found Pioneering is still going on in much of the control measures. The most current menace is the Burrowing Nematode. No doubt some control will be found. It may be that we will have to learn to live with the Nematode, as we have learned to live with other pests and troubles.

Research is under way to develop cold-resistant varieties, fruit of higher quality, better adapted for concentrate and consumer acceptance and export, and in general an upgrading of the Florida Citrus Industry.

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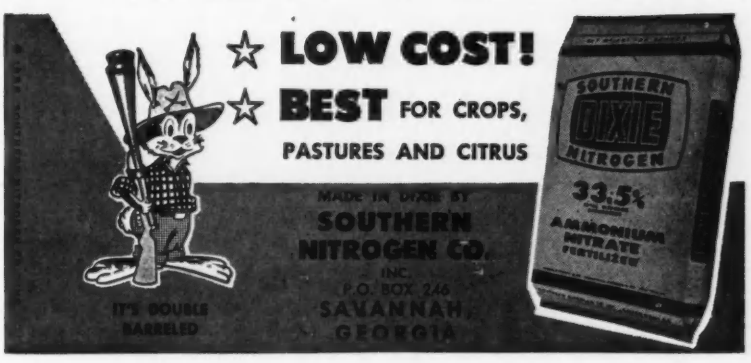
GREAT BRITAIN PLANS TO IMPORT MORE CITRUS

The Florida Citrus Commission has received information from the U. S. Department of Agriculture which confirmed predictions that Great Britain would increase their imports of citrus products this 1958-59 season.

Great Britain announced their commercial import quotas for U. S. fruits and juices will exceed $4,000,000 C. I. F., compared with approximately $3,000,000 last season. Import quotas for fresh citrus will amount to $2,940.000; canned grapefruit, $1,260,000; and all other fruit juices, $840,000.

The import dates are: Fresh grapefruit, April 1 to September 30; canned grapefruit, grapefruit juice, and orange juice, June 1 to September 30; other items, beginning October 1.

"This is certainly good news for Florida citrus growers," Homer E. Hooks, general manager of the Commission, said upon receiving this information. "Last season British purchase of U. S. citrus fruit and products amounted to about $3,000,000. This new program clearly shows that Great Britain is still one of our best export outlets for citrus. Before World War II, we sold a large part of our canned grapefruit sections pack to Great Britain. We want to resume this heavy export of grapefruit to England, because we know the market is there.



Optimum Deficiency and Toxic Concentrations of Plant Nutrients In Lakeland Sand

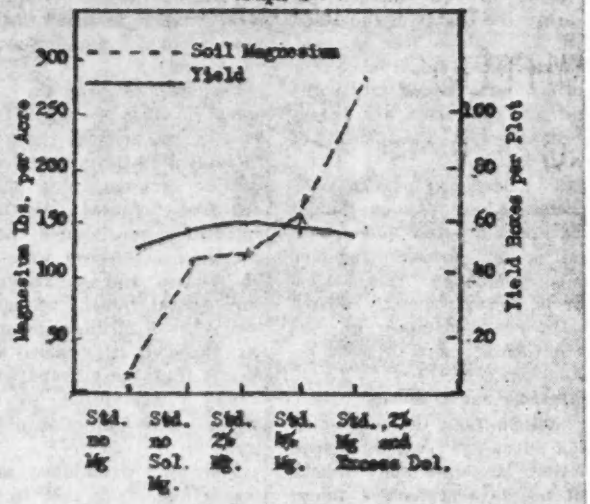
(Continued from page 12)

by plotting the available soil copper (graph 1) and available soil magnesium (graph 2) with the yield records over a 6 year period. All other nutrients except copper and magnesium were added in constant and ample amounts. The plant responses to copper and magnesium expressed in yields are not as much as expected. The response to phosphorus and potash was distinct at the low concentrations, and the response to nitrogen indicates that many groves use excess nitrogen. More complete records of these studies are given in Bulletin 3 of the Soil Science Foundation.

For the sake of clarification, a general growth curve is presented with the concentration of available soil nutrients in graph 3. This is a theoretical curve, but illustrates the response range for each nutrient. The fact that all nutrients are needed to grow crops — probably simultaneously — adds complexity when it comes to interpreting soil analysis data.

The graph shows the range of available nutrients in Lakeland sand expressed in pounds per acre and represents an average of many determinations, using the acetate extracting reagent buffered to a pH of 4.8. These data compare favorably with most laboratory records in the state, and may be used as guides regarding optimum, deficient and toxic range for each nutrient on Lakeland sand. The data for other soil types will be different from that of Lakeland

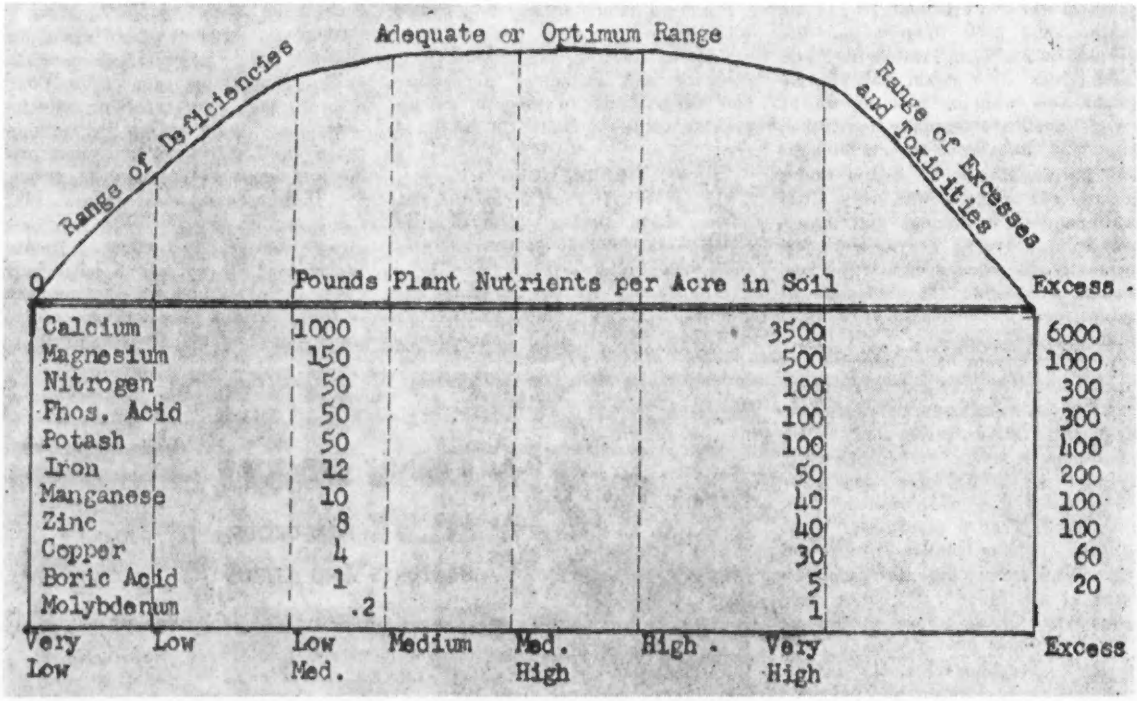
Graph 2



These calibration curves represent a comparison of 6 years yield and soil analysis data. All nutrients except copper and magnesium were constant, and applied at accepted rates and time.

PLANT RESPONSE TO VARYING CONCENTRATION OF SOIL NUTRIENTS

Graph 3



This plant response curve is necessarily general. Because of the inter-relation of one nutrient with another, it is doubtful that absolute values can be given. But there is a deficiency, optimum and toxic concentration range for each nutrient. The level of concentration will vary according to soil type. The above data are representative for Lakeland sand, using ammonium acetate extracting reagent buffered to pH 4.8.

sand.

Differences In Concentrations

Attention is called to the magnitude of differences in concentration of the various nutrients, all of which must be considered when interpreting soil analysis. The concentration of each nutrient in relation to plant response should be carefully studied. Strange as it may appear, each nutrient becomes toxic when used in excessive amounts.

This is due to individual properties of the nutrient. Some are more toxic than others, as may be seen for the trace elements compared to the major elements. The explanation for this is unknown. The low concentration limiting growth is called the deficiency range and the excess concentration is called the toxic range for each nutrient. Between these two ranges representing adequate concentration, is designated optimum.

The wide variations are explained by the inherent nature of the plant to tolerate adversities, and the fact that some nutrients are antagonistic to others. This again emphasizes the need for caution in making interpretations. Furthermore, the optimum nutrient range for different soils varies, again emphasizing the need for calibrated data as guides.

The records in the Short Research Grove indicate that citrus will produce normal crops with relatively low levels of nutrients provided they are present in a balaned relation and free from excessives. This has been amply confirmed in graphs 1 and 2 regarding the use of copper and magnesium. One of the serious problems confronting the technician as well as practical operators on sandy land is that of avoiding one element counteracting another. The wise use of soil analysis data may involve applying one nutrient to counteract the excesses of others.

Records from many sources show that high levels of copper and manganese retard the absorption of iron; that high levels of phosphorus; that high levels of potash limit the utilization of magnesium, and that high levels of calcium limit the utilization of potash.

This chain like effect of one nutrient on another must be properly evaluated in the interpretation of soil, analysis data. The overall interpretation of the data in graph 3 shows that excessive amounts of any nutrient cause an internal strain (hidden hunger), or a deficiency of other nutrients. The danger zone for each nutrient is shown in a general way in graph 3. In addition to the problem of nutrient antagonism, there is a problem of avoiding the cumulation of nutrients which intensify internal soil strain from year to year. This requires a knowledge of which nutrients leach and which do not, because once accumulations have occurred, they are not easy to correct.

Another factor involved in the interpreting of soil analysis data centers around calcium. The graph shows that Lakeland sand contains more available calcium than the combined amounts of all other nutrients. This is a strange part of nature, yet repeated records confirm the data. Ample amounts of calcium reduce the toxicities of high levels of copper. Low levels of magnesium seem to be toxic in the absence of calcium, but not in the presence of ample amounts. On the other hand, excessive amounts of calcium, especially the carbonate form, retard the availability of most trace elements as well as potash and magnesium, and this must be considered. Adjusting the soil pH is frequently the key to available trace elements, even with ample amounts in the soil.

All records indicate that optimum, deficient, and toxic ranges of sail nutrients are somewhat relative beause of the inter relation of nutrients. To maintain optimum nutrient goals, one cannot overlook the matter of nutrient antagonism. Here, the chemical eye is of prime importance in looking inside the soil. The toxic and or excessive concentration of one nutrient may be in the optimum range for another. Excessive amounts of one nutrient often cause a deficiency of another, regardless of amounts present. These inter nutrient relations add complexity to the interpretation of soil analysis data. Yet proper interpretation is one of the major keys for efficient citrus production in the future.

Even with limited calibrated data, soil analysis have enabled us to pin point a number of nutrition problems in the past. Copper, phosphates, magnesium, nitrogen and potash are examples. A wise interpretation of correlated data offers much promise for obtaining optimum nutrients in the soil and avoiding deficiencies and toxicities. With a demand for more efficient production, citrus growers are justified as never before in requesting properly correlated soil analysis data to guard against waste and excess cost.

Florida's citrus growers and fresh fruit shippers are in excellent position to enjoy an extremely good season with favorable marketing conditions in all major market ares, according to John T. Lesley, general manager of the Florida Citrus Exchange.

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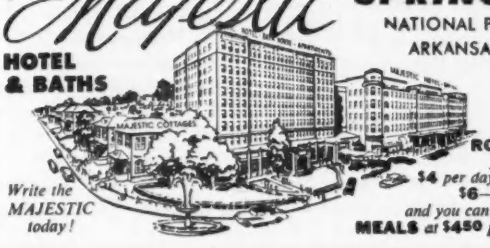

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Reports Of Our Field Men . . .

SOUTH, POLK, HIGHLANDS, HARDEE, DeSOTO AND SARASOTA COUNTIES

C. R. Wingfield
Avon Park, Fla.
Phone GLendale 2-81881

The month of August has been a hot one with scattered rains over most of the area. However in some sections there has been need for watering young trees and in a few locations there has been irrigation. The citrus trees have had enough moisture to keep a good growth coming. And the color of the tree as well as the fruit size is in good condition at this time. Young trees have been fed during the summer at regular intervals and have shown wonderful growth.

The indications are that most of this fruit has been sold at a satisfactory price to the growers. The fruit crop will be much lighter than last year due to freeze but the tree not hurt too bad has responded well and is holding a fairly good crop.

The quality is good considering the conditions that have existed and there is some mite damage as well as some melanose. A close watch should be kept for rust mite.

The vegetable growers are busy with their plans for a fall crop but indications are there will be a lighter planting of a diversified crop.

SOUTH HILLSBOROUGH AND MANATEE COUNTIES

Eaves Allison
P. O. Box 365 — Sarasota, Fla.
Phone Fulton 8-2611

Citrus crops vary from heavy to light in this area. Some groves have a record crop and others run from one-third to one-half of normal. The variation due of course to last winter's cold damage. The same spotty condition goes also for scale and mite populations.

Sizes are good and in most cases quality and appearance is excellent. Some crops show heavy melanose attack. Trees where fertilized properly have made very satisfactory growth — both bearing trees and young stuff.

The seed beds of the vegetable grower are now showing contours of light green and the snorting of the bulldozer is again heard in the land. Draglines are roaring and clanking, opening up the drainage ditches once more, and tractors have again taken up their endless task of crossing and re-crossing the same old fields — traveling hundreds of miles and going nowhere.

Grower operations are restricted this time to a considerable degree as last winter's casualties turned out to be pretty severe. However, one good fall and spring and the whole picture will be rosy again.

HIGHLANDS AND POLK COUNTIES

J. K. Enzor, Jr.,
P. O. Box 1304 Winter Haven, Fla.
Phone CYpress 3-4716
R. E. Lassiter, Jr.,
1168 Lakeshore Blvd.
Lake Wales, Fla.
Phone 3-3813

We have been having good rains up through the middle of August in this area, however there have been some areas which have needed more water in the last few weeks due to scattered rainfall. On the whole moisture conditions in this area are good at this time.

Much of the pruning of the dead wood caused by cold damage has been completed. In some blocks where the trees were hurt quite severely growers are not going ahead with the pruning until sometime later when and if more growth occurs.

Growers have been applying dolomite in those blocks where it is needed. We cannot stress too strongly the importance of using this material where the pH values are too low.

We have been finding some rust mite populations behind the Zineb sprays lately, however in many cases these populations seem to be dying off. Where rust mite are numerous, sprays for their control should be applied without delay.

There has been an increase in red scale activity. Growers should be checking for scale infestations where the scalicide was applied in June. An oil spray at this time will definitely retard degreening and will reduce solids, especially where a previous application was made this summer. Parathion or malathion should be used at this time.

Lyons Fertilizers
Produce
Maximum
Crops
Of
Finest
Quality

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Uncle Bill Says:

Here it is the first of September, 'n before we know it we'll be right in the middle of another shippin' season . . . 'course most everybody who should know tells us our crop this year will be a bit late in maturin' so they won't be as much fruit goin' to market quite as early as has been the custom in years past.

They is one thing most everyone agrees on, however, and that is that prices for our crops this year will be a heap better, not only in the early part of the season, but throughout the whole period up until the last Valencia has gone to market.

So the urgent need to ship realy early in order to git the best prices right off the bat ain't near as urgent this season as it usually is. A lot of crops is reported already sold fer good prices, while offers from buyers generally ought to be mighty ensouragin' to all of us.

We know, too, that one of the reasons why prices is so good is 'cause of the freeze which affected trees and crops last winter . . . then, too, the public which buys our crops it seems has developed a greater taste fer our fine citrus fruit.

This situation should inspire every grower to produce the very finest fruit he kin raise, by proper fertilizin' to keep his trees in strong healthy condition, 'n by cultivatin' at the proper time . . . and to be sure to be constantly on the watch for insect pests which could be harmful to his crops.

Actually, they ain't no use fer me to try to tell you other growers how to make your trees produce fine fruit, but fer my money I'm still mighty sold on the fact that Lyons Fertilizers Produce Maximum Crops of Finest Quality. If you haven't proven this fact to yourself, this would be an awfully good year to make the test.

Citrus Fruit Importations To Be Rigidly Inspected

Two Federal agencies have promised Robert W. Rutledge, Florida Citrus Mutual general manager, that they will use every precaution to see that anticipated increase of citrus fruit importations into the U. S. next season will be rigidly inspected to protect Florida citrus growers.

Rutledge recently wrote the two agencies pointing out that because of unexpected shortage in the domestic crop during the 1958-59 season he foresees that foreign citrus producers will attempt to increase materially their shipments of fruit to the United States.

Rutledge requested the agencies, the Food and Drug Administration of the Department of Health, Education and Welfare, and the Plant Quarantine Division of the U. S. Department of Agriculture, to be on the alert in its inspection of all citrus importations to safeguard Florida growers against foreign citrus diseases and pests.

E. P. Reagan, Director of the Plant Quarantine Division of the USDA, wrote Rutledge:

"We appreciate your awareness of the importance of preventing the entry of new citrus pests with imported fruit and you may be sure that we share your concern. You may also be assured that no citrus fruits will be permitted entry unless they can be adequately treated or otherwise safeguarded."

Chester T. Hubble, assistant to the Director of the Bureau of Enforcement of the FDA, replied to Rutledge:

"We are advising our field districts covering ports at which such products may be expected to be offered for entry into the United States of this possibility so that they may give it such attention as the facts may warrant in the event such shipments actually arrive."

At present citrus fruit importation from Argentina and Brazil is not authorized because of the presence in these countries of sweet orange scab.

However, Rutledge said, he expects attempts will be made by Spain, Israeli, Cuba and Mexico to step up citrus shipments to the U. S. because of the anticipated short supply of Florida citrus and citrus products during 1958-59.

"We must be certain that every possible effort is made by all agencies concerned to see that our Florida growers are completely protected from any pests or diseases which might result from the importation of fresh citrus or processed citrus products sent to this country from abroad," Rutledge said.

Business Notes

POTASH CO. OF AMERICA NAMES DAVIS PRESIDENT

F. O. Davis, executive vice president and treasurer of Potash Company of America, has been named president of the company to succeed G. F. Coope, who has retired after leading the company for 21 years.

Davis has also succeeded Coope as president of the Potash Company of America, Ltd., the wholly-owned Canadian subsidiary of PCA now completing a development and construction program at Saskatoon, Saskatchewan, Canada.

Coope, retiring under the company's established retirement policy, will remain on the board of directors and the executive committee of the company. He will also serve as a consultant in both places.

W. H. Barelett, comptroller of the company, has been named treasurer.

Since joining the company in 1936, Davis has served as comptroller, treasurer, managing director of PCA Ltd., and executive vice president. With his appointment as president of the company, the managing director post of the Canadian subsidiary was eliminated.

FLORIDA TO BE HOST TO COLLEGE EDITORS AT 1959 MEETING

The University of Florida will be host to the 1959 meeting of the American Association of Agricultural College Editors, according to J. Francis Cooper, head of the editorial department in the Agricultural Experiment Station and Extension Service.

The group voted to come to Florida at its recent session at the University of Wisconsin. Florida was host to the editors in 1937.

Cooper, a past president of the organization, says the meetings are attended by about 300 people representing most of the states, the U. S. Department of Agriculture, and commercial agencies.

Jack Shoemaker of the State Deparement of Agriculture, an associate member of AAACE, will assist in entertaining the visitors.

Milk serves as a good supplementary source of vitamins A and C and other essential food elements.

"Now that you're a part of our happy family, Finley, let me give you some fatherly advice—"

Classified Ads

SUPERIOR CITRUS TREES —Guaranteed no freeze damage. Nursery inspection invited. Most varieties available for Fall 1958 and Spring 1959 planting. For quotations call GLendale 2-7541, or write WARD'S NURSERY, INC., Box 846, Avon Park, Florida.

VALENCIA budded on rough lemon, 3/4 inch average — inspected and nematode free. Phone 2-7917. Ralph S. Jones, Crooked Lake, Babson Park, Florida.

FOR SALE — Buffalo Turbine Duster, 3-joint tractor hitch. Can be used both for field crops and trees. Bruce Anderson, LaBelle, Florida.

EXPERIENCED MAN to top work 20 acres of 15-year old pineapple trees to navel oranges. Advise basis of charges including cutting back old trees.
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LEAF ANALYSIS: Analysis for nitrogen, phosphorus, potassium, calcium, magnesium, boron, manganese, iron, copper, zinc and molybdemum . . $15. Write for details to Dr. Wolf's Agric. Labs. 2620 Taylor St., Hollywood, Florida.

Look for this identifying Seal of Approval when you buy. It's your assurance of extra-value fertilizer.

...the seal that guarantees you **won't be**

TOO LATE for TOP PROFITS

You know the penalty of a shortage of magnesium in your citrus groves. Irregular yellow blotches in the leaves signal that you will soon be faced with a marked reduction in yield, size, and quality of your fruit. And then, before you know it, *it's too late for top profits!*

You can't afford to gamble with your next harvest . . . not when positive protection, plus improved fruit flavor, can be yours for only pennies per tree. Act now to insure an adequate supply of magnesium this season by specifying fertilizer containing Sul-Po-Mag®... also called SPM . . . in your next fertilizer order.

Why SPM? Sul-Po-Mag is a combination of water-soluble, fast-acting, readily available magnesium and premium sulphate of potash. Most citrus fertilizer manufacturers make premium grade fertilizers containing Sul-Po-Mag. For your protection, look for the SPM seal.

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Sul-Po-Mag® ...positive protection for only pennies a tree

Water-Soluble Double Sulphate of Potash-Magnesia
($K_2SO_4 \cdot 2MgSO_4$) 22% K_2O – 18% MgO

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It is true that we don't sell every grower in Florida the fertilizer he may use . . . . but you will find if you investigate that those whom we do sell are generally well satisfied customers.

These same products are available to all users of fertilizers . . . . and we would like to suggest that before you purchase your next supply of fertilizer you check the results obtained from Lyons users.

Make a test, if you will, of the results obtained on a plot you may set aside in your own grove for the purpose . . . . and make your own comparison.

And, of course, our Field Service Representatives are always glad to cooperate with you in every way possible.

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